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Residential Mobility and Local Housing Market Differences

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Abstract

Residential Mobility and Local Housing Market Differences

This paper extends previous literature on variations in mobility rates across local housing markets by examining the linkage of mobility rates at the household level to the structure of local housing markets. The results indicate that residential mobility rates differ widely across local housing markets, substantiating the view that residential relocation is intimately intertwined with conditions at the local level. Local housing market conditions also have different effects on mobility rates for renters and owner-occupiers.

The results show that variation in residential mobility rates across housing markets can be partly explained by level of urbanization, the tenure structure, the degree of government intervention, and the size of the housing market. Remarkably, these differences in local housing markets cannot be seen to be related to housing market features only. The results suggest that differences can also be attributed to the behavior or attitude of households with respect to housing.

1 Introduction

Residential mobility is an issue which has attracted considerable attention over the years. Clearly, variations in residential mobility rates are important for a number of reasons. It is increasingly recognized that mobility rates may well have implications for the social stability of urban neighborhoods. Since housing supply is relatively inelastic in the short run, changes in neighborhoods arise mainly from shifts in the composition of the population. In short, changes in the composition of this population are determined by changes *within* the existing population, as people grow older, as well as by changes *of* the population, as people move residence. Residential mobility, which varies widely with characteristics of the household, is thus one of the key factors in the demographic dynamics of the neighborhood. Also, residential mobility is important for the functioning of the local housing and labor market (cf. Cameron and Muellbauer, 1998; Whitehead, 1999). Residential mobility is the mechanism through which the household generally adjusts its housing consumption. Generally, this generates a vacancy chain which may lead to a better aggregate matching process in terms of housing consumption relative to housing needs (cf. Dieleman et al., 2000). Residential moves of households to bigger dwellings give newly forming households and those housed unsatisfactorily the possibility to enter the housing market or improve their residence, respectively. Hence, restrictions on residential mobility have strong implications for the local housing market, and may also be an important source of mismatches and other inefficiencies in the labor market (Hughes and McCormick, 1987; Henley, 1998; Meen and Andrew, 1998).

This process of residential relocation is thus embedded in, and influenced by, the housing market conditions at the local level. The structure of local housing markets, including local land-use regulations for new construction, allocation rules, or geographical factors, all have a great impact on residential mobility through the number of offers and the average housing market price (cf. Clark and Dieleman, 1996). Housing market mobility and housing market choices are set within the local economy which differ from region to region.

In the empirical research on residential mobility most emphasis has been on the demand side, dealing with how choices relate to households' preferences and stages in the life course (cf. Clark and Dieleman, 1996). Changes in household composition and or job location all affect the probability of moving. The literature on the interplay between residential mobility and the structure of local housing markets is much less extensive (see for a recent review, Dieleman et al., 2000). Although earlier results find evidence of regional differences in households' residential mobility rates (see Clark et al., 1986; Clark and Dieleman, 1996; Meen, 1999), systematic analyses of these differences and their underlying causes, have been rare, or are based

on a quite limited set of housing markets (cf. Dieleman et al., 2000). Nevertheless, it is possible to draw some inferences about the underlying causes. Among the most important contextual factors are the tenure structure of the housing stock and the influence of government regulation of housing (Lee et al, 1994; Clark and Dieleman, 1996). Although the effects of government interventions in housing markets are hard to measure on the national level because they vary widely by municipality, Strassmann (1991) indicates that government intervention has the effect of lowering residential mobility. The effects of local housing allocation rules, which most directly influence housing choice and mobility by allocating housing units to specific households, however, are not very well understood (Clark and Dieleman, 1996).

The research reported here serves to elaborate on the role of housing market conditions. It is the interplay between residential mobility at the household level and the local housing market conditions which is at the centre of this paper. How can we understand these differences in residential mobility rates between households? Do local housing market conditions lead to significant differences in residential mobility rates? What housing market factors are important in explaining these differences? To do this we focus on differences in residential mobility rates at the level of individual households across local housing markets. In the empirical analysis, we first consider whether differences in residential mobility between local housing markets exist, after which we consider what housing market features determine these differences in residential mobility rates.

2 Why Households Move

Why households move is of great importance for our understanding of who moves. This has been studied in particular by sociologists (see Rossi, 1955). Although household motives for residential mobility are just one side of the coin, they nevertheless give important insights into the decisions made, and the triggers leading to a residential move.

Generally, residential mobility is associated with specific changes in households, changes in housing, and changes in the housing market. Basically, as formulated in the seminal work of Rossi (1955), all these triggers lead to changes in housing needs. Traditionally, empirical analyses have linked residential choice (Deurloo et al., 1987) and residential mobility (Clark et al., 1986, Clark and Withers, 1999) to stages in the family life course. Also, the effects of job changes, the loss of a job and a spell of unemployment on residential mobility have been examined (Van Ommeren et al., 1999, Clark and Withers, 1999). Changes in households are probably the most important reason why families move. Over time, a number of different changes may take place (simultaneously), concerning relationships, and household size. Households are formed but may also break up, experience income growth

but perhaps also a period of unemployment or a change in job location. Housing needs generally vary with these stages in the households' life course (Clark et al., 1996). Since changes in housing consumption are usually associated with moves, households may eliminate the gap between actual and desired levels of housing consumption by moving (cf. Hanushek and Quigley, 1979; Van der Vlist et al., 2001).

From earlier contributions in the literature, we know that these stages in the life course of households can be summarized by the age of the head, the size of the household and the amount of space in the dwelling (Deurloo et al., 1987; Mulder, 1993; Clark and Dieleman, 1996). Some empirical findings suggests that residential mobility decreases monotonically with age (Clark et al., 1986) although others report a non-monotonic relationship (Pickles and Davies, 1991). Variables relating to space, like the number of rooms and the dwelling type, seem to decrease residential mobility. Clark et al.(1986) report that household size, and thus space needs, vary over the life course, with increasing needs in the early stages but decreasing needs in later stages. Thus, young households tend to move more often if the house is small, whereas when they become older they tend to move more if the house is large. Other variables relating indirectly to the life course, such as income, assets, occupation, and education, turn out to play a critical role, although structural differences exist between the rental and owner-occupier sector of the housing market. For example, income, which is important in explaining residential mobility in the owner-occupier market, is actually less important in explaining residential mobility in the rental sector. As expected, wealthier households in owner-occupied units are more likely to move because they are less likely to be credit-constrained. On average, mobility rates in the rental sector are higher than in the owner-occupier sector. These lower mobility rates of owner-occupiers has usually been ascribed to a greater commitment to the neighborhood, higher moving costs, and greater flexibility in modifying the current house. For both sectors, educational differences in part explain variation in residential mobility rates. Highly educated workers tend to have higher mobility rates compared with less educated workers (Van Ommeren, 2000).

Changes within households are, however, not the only reason for moving residence. Another important reason why households move is formed by changes in the housing market. The booms and busts of the housing market in Britain clearly revealed that changes in average house prices affected residential mobility (Henley, 1998). Residential mobility can be for portfolio reasons in that households change tenure or move up the housing ladder. Also, households have used residential mobility to release their equity, i.e. the property value minus mortgages (Henley, 1998). Deurloo et al.(1987) report that movements of owners are generally more related to capital accumulation than to any specific housing needs.

Residential choice and mobility, however, is also embedded in the spatial environment and cannot be fully understood without considering the housing market circumstances. Basically, observed hazard rates of residential mobility are the result of both households' choices and housing market opportunities. In the first part of this section we have seen that household needs differ between households, and also vary over the life course. In the remaining part of this section, we consider how variation in housing market characteristics relate to variation in residential mobility rates. Because the large majority of moves are within the same housing market area, residential moves are most intimately intertwined with local market conditions (Dieleman et al., 2000). The number of housing market opportunities that households receive depend on the local housing market structure like tenure structure and tightness of the market as well as on government regulations (Clark and Dieleman, 1996). Dieleman et al. (2000) examine variation in residential turnover across 27 large metropolitan areas in the US. They argue that it is critical, in understanding the functioning of local housing markets in the process of residential relocation, to include the tenure structure in the analysis. They find that the proportion of rental housing and the size of the metropolitan area increase residential mobility rates. Also of interest, they find that price levels of both owner-occupied and rental housing co-vary consistently and are related to the same characteristics which determine the variation in residential mobility. Their results suggest that a greater proportion of rental housing increases the price of owning.

For the Dutch context, in which the government directly regulates part of the housing market (both rental and owner-occupier), these effects are less well understood (Clark and Dieleman, 1996). Government intervention, to which we turn in the next section in more detail, can have various opposite effects on residential mobility rates. On the one hand, government intervention in Western Europe which has led to a situation where substantial parts of the housing stock are in the social rental sector, would increase residential mobility. Because of the lower quality of social rental units households move from the social rental sector as soon as they can afford an other unit. On the other hand, government intervention and rent subsidies create benefits for those not moving, and thus would lower residential mobility (cf. Clark and Heskin, 1982; Strassman, 1991).

What is clear is that in explaining the observed pattern of residential mobility due account has to be taken of the motives why households move, and the specific possibilities of those who move. In consequence, households may have identical patterns of residential mobility but different underlying reasons, or may have the same underlying reason but different patterns of residential mobility. In practice, therefore, patterns of residential mobility may be quite diffuse and hard to relate to household characteristics only. Differences in local allocation rules, in housing market size and urbanization

degree are also very likely to lead to variation in the residential mobility rates of households.

3 Housing Policy

Before turning to the empirical application, the peculiarities of the Dutch housing market policy and its implications for observed patterns of residential mobility will now be described in more detail, with special attention to the local housing allocation rules in The Netherlands.

The current system of government intervention, either by local or central government, found its origin in the post-World War II reconstruction period. After the Second World War, the housing shortage was enormous, which led the government to set rents and initiate strictly planned, large-scale construction of subsidized housing. Although the most urgent housing shortage was relieved in the late 1950s, the central government kept the same housing policy in the 1960s and 1970s as during the reconstruction phase (cf. Van der Schaar, 1987). All this has led to a rapid expansion of the public renting sector, whereby the private renting sector almost disappeared. During the 1980s and 1990s housing policy gradually changed to a more market-oriented system which exists today (cf. Feddes, 1995).

In the 1980s, it gradually became clear that this housing policy, aimed at providing affordable housing, was no longer necessary or desirable (Priemus, 1996). The subsidies weighed heavily on the national budget. Also, the late 1980s showed that the large-scale construction of subsidized housing after the Second World War, had led to a one-sided housing stock, dominated by uniform large, inexpensive family dwellings. As a consequence, subsidized construction was gradually abolished during the 1990s and replaced by a local housing policy, where local authorities, housing corporations and market parties cooperate.

Besides initiating new construction of both subsidized rented accommodation and owner-occupied dwellings, the central government intervened with rent controls and rent assistance programs (cf. Van der Schaar and Hereijgers, 1991). During the 1990s, major changes took also place in the rental sector (Priemus, 1996). Most public, locally-controlled rental agencies were transformed into private, non-profit housing corporations. Rents may now be set freely by the landlord within a certain range, depending on the dwellings' amenities. Also, in a large number of cities, waiting lists for rental units have been gradually replaced by a system under which households can apply for vacant rental units, whose allocation among eligible households depends on their search/waiting period.

These allocation rules play an important role in Dutch housing policy; regulating the entry into and the movements within local housing markets. The main reason for these rules, the local authorities argue, is to attempt

to prevent mismatches (in terms of income or household size) and to reserve part of the housing stock for locals wishing to enter the housing market or for those working in the local community. Also, this system of allocation rules is to provide affordable housing to those who need it most, and to stimulate residential mobility of households no longer eligible for those units (cf. Van der Schaar and Hereijgers, 1991). Regardless of the submarket - public rental, private rental, the existing owner-occupied stock or new construction - a complex system of allocation rules exists. Although local rules may differ locally, the most important allocation rules can be summarized as:

- Rental sector: social stock

  To obtain a rental unit in the social sector, households must often comply with stringent, unit-dependent eligibility rules, in terms of a maximum income and a minimum number of household members. In addition, households must either live or work in the local community. Once a household has obtained a housing unit, it cannot be forced to move as eligibility rules no longer hold.

- Rental sector: private market

  Beyond a certain rent, anybody is free to move into a rental unit.

- Owner-occupier sector: existing housing stock

  To buy a unit in the owner-occupier sector, households are relatively free in their choice. However, below a certain price threshold, which may vary among local communities, households must live or work in the local community. Transaction costs are highest in this submarket. In addition to search costs and solicitor's costs, all transactions are subject to a 6% tax paid by the buyer.

- Owner-occupier sector: new construction

  Like in the social rental sector, households must often comply with very stringent eligibility rules in order to obtain a newly constructed dwelling. In some cases, however, no eligibility rules exist. In most cases, households must live or work in the local community, and sometimes an income maximum is set as well. Recall that most new residential construction sites are designated by the central government. As the number of newly constructed units is limited, allocation rules exist which allocate these units randomly to eligible households. Individual lots are hardly ever available for sale, and, if available, local government rules regarding dwelling type and construction materials have to be obeyed.

It does not need much imagination to understand that these allocation rules may affect housing consumption as well as local patterns of residential

mobility. Especially in the Randstad area: Amsterdam, Rotterdam and Utrecht, and the area between them, eligibility rules are most stringent and most likely affect mobility rates. Of course, in housing markets with an abundant supply of dwellings these rules may be less strict, enabling households from other local markets to enter the market more easily. In fact, households wishing to move between different local housing markets have greater difficulty obtaining a dwelling. In general, a household, wishing to move to a housing market in which it does *not* work, is only eligible for a unit of the existing owner-occupier sector (above the local price threshold) or the free-market rental housing stock. Usually, for households in a social rental unit who are no longer eligible for the social rental sector, residential mobility is associated with a steep rise in their housing outlay. In consequence, households think twice before they move out of their unit, and may hence stay in a unit which is actually no longer intended for them (Clark and Heskin, 1991). The share of social rental housing is thus an important feature of the local housing market structure, and provides a good indicator of the importance of allocation rules in the operation of the local housing market. Also, because these rules vary by municipal, government regulation may as well explain the variation in mobility rates across space.

4 Data

In the empirical analysis we make use of the Dutch Housing Demand Survey (WBO)(cf. CBS, 1995a,b). A random sample of all officially registered individuals in the Netherlands of 18 years and older are asked to participate in this survey. From a total of 11,739,174 individuals of at least 18 years old, 84,326 were asked to participate in the 1993/94 WBO, of whom 74.5% actually participated.

The 1994 survey contains extensive information on a cross-section of Dutch housing and households (see also Van der Vlist, 2001). It contains information on features of the current occupied dwelling, the former occupied dwelling, and of the household itself, such as the number of household members, their employment status, commuting distance, dwelling type, tenure, rent or mortgage, and income. Particularly important for the empirical analysis of residential mobility is the fact that it also includes length of current residence, and retrospective information on the length of former periods of residence. These residential durations are measured in years, and sometimes even in periods of 5 years, so that basically we have grouped or interval data on residential durations. Figure 4 illustrates the four types of residential history that could be constructed from our data set. Note that, since the current spell is ongoing at the time of the questionnaire, right-censoring occurs because the destination is unknown. These (left- or right-) censored cases are indicated in the figure by a question mark.

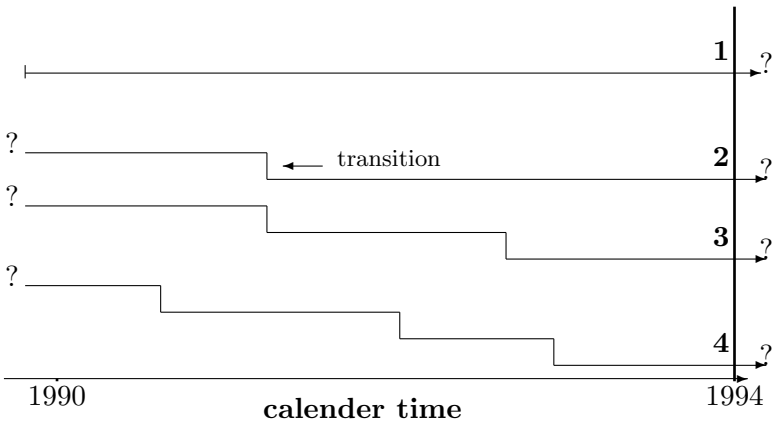

Figure 1: Residential duration data

For the first type of households that did not move during 1990-1994, in total 40,251 observations, the elapsed duration is known. For the second group who moved once during 1990-1994, in total 13,474 observations, we have a left-censored spell of which the residual duration is known, and a second, right-censored, spell. For the case of two transitions (2,354 observations); or three transitions or more (757 observations) a left-censored spell, one, two or three completed spells, and a right-censored spell are known, respectively. In the empirical analysis reported in this paper we use the information on the current residence. For this only those observations are selected for which the participant is the principal occupant of the dwelling. Table 1 gives some descriptive statistics for our sample.

As the table shows, shares for families either with or without children are highest. The descriptive statistics also show that the sample is basically representative for the Dutch housing market in terms of tenure, dwelling type and region.

In the WBO Survey, households who moved in the 1990-1994 period (14176 observations) were also asked about their most important reason of the most recent move. We summarized these answers by distinguishing between four main categories. In this, *household and family-related reasons* refer to residential mobility reasons of marriage and divorce, household size and composition, and health. *Labor and occupation-related reasons* refer to reasons of a change in job location or occupation, whereas *housing-related reasons* refer to reasons of tenure, housing outlay, and dwelling type. Finally, there are *commuting reasons* referring to the length of the journey to work. Table 2 summarizes this information. The figures in the table indicate

Table 1: Descriptive statistics of the 1994 WBO-sample

Household Characteristics		*Spatial Characteristics*	
one person household	.16	social housing	.38
head with child	.03	highly urbanized	.366
head and partner	.36	urbanized	.190
head and partner with child	.44	rural	.444
multiple household	.01	North Netherlands	.131
household size	2.72	Groningen	.048
age of head (years)	46.2	Friesland	.041
Dwelling characteristics		Drenthe	.043
detached house	.16	East Netherlands	.204
semi-detached house	.14	Overijssel	.078
corner house	.15	Gelderland	.109
terraced house	.31	Flevoland	.016
apartment	.23	West Netherlands	.446
number of rooms	4.2	Noord-Holland	.137
renter	.47	Utrecht	.068
owner-occupier	.53	Zeeland	.034
rent (Dfl./month)	553.3	Zuid-Holland	.209
potential selling price (Dfl. x 1000)	225	South Netherlands	.219
Labor market characterstics		Noord-Brabant	.136
unemployed	.05	Limburg	.082
not-in-labor-force	.28	*Education*	
student	.01	lower vocational	.44
employed	.59	intermediate vocational	.30
self-employed	.07	higher vocational/university	.26
commuting distance (kms)	17.2		
income (Dfl. x 1000)	55.57		

Table 2: Most important reason of moving residence

	share
household and family-related reasons	0.38
labor and occupation-related reasons	0.08
commuting distance	0.05
housing-related reasons	0.50

that housing-related reasons are by far the most important one. From the discussion in Section 2 we know that these housing-related reasons are also generally related to household and family-related reasons. This figure is in sharp contrast to the 5 percent who indicated that they moved for reasons connected with the length of the commute.

5 Model Specification and Estimation

5.1 Proportional Hazard Model

In the econometric analysis of the residential mobility rates of households, we analyze the sojourn time of the household in the dwelling. These transition rates, or hazard rates, represent the probability that a household, which has occupied a residence for a time t leaves it in the short interval of length dt after t (cf. Lancaster, 1990). The differences in transition rates are related to differences in housing market opportunities and in the housing price, and to differences in households' preferences. Because households' preferences vary over the family life course, these are also of great importance for understanding who moves. In the reduced-form approach, we ascribe differences in residential duration to different household, housing and housing market characteristics. In the remainder of this section, we formulate a simple single-spell proportional hazard model of residential mobility. A general specification for the proportional hazard model of residential mobility is given by:

$$\theta(t;x) = \psi(t)\theta(x), \tag{1}$$

where $\psi(t)$ is a flexible baseline hazard; and where $\theta(x)$ is the systematic part of the hazard (Lancaster, 1990). The baseline hazard gives the shape of the hazard function for any individual, whereas the systematic part gives the level of the observed hazard. Because the baseline hazard gives information regarding residential duration dependence, we will instead of estimating a Cox model, estimate the baseline hazard jointly with the parameters of interest. We take a piecewise-constant baseline hazard, to let the data suggest the form of the duration dependence structure, rather than imposing it a priori. As is well known, this prevents misspecification of the duration dependence structure, and substantially reduces the potential bias in the parameters of interest (cf. Ridder, 1987).

The piecewise-constant hazard divides the time axis into M intervals ($m = 1..M$), with discrete changes at the points $c_1, c_2, ..c_{M-1}$, with c_0 and $c_M = \infty$. Let:

$$\psi_m(t) = \begin{cases} \psi_m & if \ c_{m-1} \leq t < c_m \\ 0 & otherwise \end{cases} . \tag{2}$$

Then, for $\theta_i(x) = \exp(x_i'\beta)$, the survival function $S(t)$ equals:

$$S(t) = \exp\left(-\exp\left(x_i'\beta\right)\exp(\psi_m)(t - c_{m-1}) - \sum_{i=1}^{m-1} \exp\left(x_i'\beta\right)\exp(\psi_m)\left(c_m - c_{m-1}\right) \right), \tag{3}$$

and the mean duration equals (cf. Murphy, 1996):

$$\begin{aligned} E(t) \quad = \quad & \sum_{m=1}^{M} \exp\left(-x_i'\beta\right)\exp(-\psi_m)\left[1 - \exp\left(-\exp\left(x_i'\beta\right)\exp(\psi_m)\left(c_m - c_{m-1}\right)\right)\right] \\ & \times \prod_{j<m} \exp\left(-\exp\left(x_i'\beta\right)\exp(\psi_j)\left(c_j - c_{j-1}\right)\right). \end{aligned} \tag{4}$$

From statistical theory, it is known that the formulation of the likelihood function depends not only on the statistical formulation of the transition process but also on the sampling scheme (cf. Ridder, 1984, or Lancaster, 1990). Stock sampling refers to sampling households at a fixed point in time, whereas flow sampling refers to sampling the flow of households who enter the housing market during a certain interval of time. In both cases, one would like to identify the distribution of completed durations on the basis of observed durations. Ridder (1984) shows that, if a sample is drawn from the flow, we can analyze the sample as if it were a sample of completed durations. For stock sampling, however, this no longer holds true. Using stock sampling means that durations are ongoing at the moment of the questionnaire and necessarily right-censored, with short spells underrepresented. Also, if complete housing market histories, i.e. initial conditions, are unknown, this necessitates the assumption of a stationary housing market. From the description of the data in Section 4, it is clear that the 1994 sample used in the empirical analysis of this paper is a stock sample. Given the stock sampling scheme, we take account of right-censoring, and of length-bias by conditioning on the mean when formulating the likelihood. The likelihood then equals:

$$\ln L(\vartheta) = \ln S(t) - \ln E(t), \tag{5}$$

which parameter vector ϑ is estimated using Maximum Likelihood methods.

In the specification of the proportional hazard model, we follow the discussion of Section 2, and include controls to capture the household's housing needs, and local housing market features. Also following the discussion, we estimate models for the rental and owner-occupier sector separately. Because we do not follow households over time, nor do we have information on the changes which occur through time, we relate elapsed duration to proxies related to the life course (see similarly Mulder, 1993). The most important factors relating to housing needs are: age, household characteristics, and household size. In addition, level of education of the head, occupational status, commuting distance, income and assets are included. Following the

literature, we also allow for interaction among age, household size, and the number of rooms. Housing features, like dwelling type and the number of rooms, are included as proxies for housing space (cf. Clark et al., 1986). In the empirical analysis, we determine first whether the hazard of residential mobility differs among local housing markets, after which we try to relate these differences to local housing market features. We use the share of social rental housing as a measure of housing market control by allocation rules, and the total number of dwellings as a measure of the size of the market. Also, because the share of social rental housing is correlated with the level of urbanization, we determine the effect of housing market features for different levels of urbanization.

5.2 Estimation Results

This section offers the estimation results for the hazard model of residential mobility for both the rental and the owner-occupier market. The analysis and the discussion of the results aims to shed light on the interplay between residential mobility rates at the household level and local housing market conditions. How to understand the variation in residential mobility rates across housing markets and between households? What housing market factors are important in explaining differences between housing markets?

Table 3 gives estimation results and t-values for a subsample of the rental market and the owner-occupier market, with associated estimates for local housing market dummies presented in Appendix A. Reference cases are indicated by (-). Positive values of the parameters indicate that an increase in the value of the regressor is associated with a higher hazard rate, and thus a shorter length of stay.

Our estimation results reveal that, even after controlling for dwelling characteristics, household characteristics and labor market status, differences between local housing markets still exist and can be quite large. Also, there seems to exist a distinctive geography of residential mobility in local housing markets, with lower mobility rates in the core regions than in the regions at the periphery. The results thus indicate that local housing market factors may at least explain part of the variation in residential mobility rates of households. It also shows that the impact on the hazard rate may be large relative to other, that is housing and household-related, factors. This result is consistent with the finding of Clark et al.(1986), who analyzed differences in mobility rates between four regions. Our results extends this finding, indicating that the variation in households' residential mobility rates between local housing markets *within the same region* can be substantial. The reason for this is that, because households move over short distances, generally within the same local housing market, especially local market conditions and allocation rules matter. Because allocation rules most likely have a different effect on mobility rates for renters and owner-occupiers it is no surprise that

Table 3: Results for the stock data proportional hazard model of residential mobility

	Rental		Owner	
	estimate	t-value	estimate	t-value
age (/100)	-19.51	-17	-23.7	-13.5
head	-0.14	-0.23	-0.92	-9.6
head+child	-0.23	-2.58	-0.61	-3.8
head+partner	-	-	-	-
head+partner+child	-0.18	-2.40	-0.21	-3.3
multiple households	-0.64	-3.46	-2.75	-5.1
household size / 10	-0.43	-0.62	-0.51	-0.5
number of rooms	0.16	2.94	-0.23	-2.8
detached house	-0.64	-3.46	-0.82	-7.8
semi-detached house	-0.54	-5.3	-0.32	-3.3
corner house	-0.23	-3.54	-0.28	-2.9
terraced house	-0.26	-4.8	-0.37	-4.1
apartment	-	-	-	-
self-employed	-0.27	-2.91	-0.04	-0.7
employee	-	-	-	-
unemployed	0.27	3.95	-0.01	-0.1
not-in-labor force	0.18	2.63	0.10	1.2
student	-0.01	-0.16	-0.04	-1.3
low vocational	-0.08	-1.88	-0.20	-4.7
intermediate vocational	-	-	-	-
high vocational and university	0.14	2.66	0.18	4.2
commuting distance (one-way/100)	0.12	0.97	0.31	3.3
ln(income/1000)	-0.05	-2.40	0.08	3.5
assets/1000	-0.004	-0.63	0.001	0.4
age×household size	2.43	1.64	1.16	0.6
age×number of rooms	-1.02	-8.31	0.17	1.0
age×age	13.10	13.96	10.7	7.0
ln(potential selling price/1000)	-	-	0.86	15.4
ln(monthly rent)	1.25	19.86	-	-
Baseline hazard				
$\psi_1 : t \leq 9$ year	-1.51	-3.3	0.40	0.7
$\psi_2 : 10 < t \leq 17$ year	0.58	1.2	2.54	4.1
$\psi_3 : 17 < t \leq 25$ year	0.97	1.9	3.05	4.8
$\psi_4 : 25 < t \leq 38$ year	2.16	4.4	4.03	6.4
$\psi_5 : t > 38$ year	2.95	5.8	4.79	7.5
Number of observations	11231		13277	
Log-likelihood	-35744		-43416	

+ 46 local housing market dummies
(see Appendix A)

differences in local market conditions have a different effect on mobility rates of renters and owner-occupiers (see also Clark and Dieleman, 1996). At the end of this section, we return to these local housing market differences in mobility rates.

Earlier in this paper we already pointed out that the most important reason of why households move are related to housing needs, that is, *household and family-related reasons* and *housing-related reasons*. In general, the results indicate that residential mobility depends negatively on the utility experienced from the dwelling, confirming the importance of housing-related reasons of moving residence as reported in Table 2. Compared with apartments, the hazard rate in terraced houses is lower, as people tend to stay longer in terraced or (semi-) detached dwellings. The number of rooms also show the presence of structural differences between renters and owner-occupiers. This is confirmed by the effect income has on mobility rates. The results indicate that rising income increases mobility rates of owner-occupiers, whereas it decreases mobility rates of renters. A reason for this finding is that, because credit-constraints play a very important role in the owner-occupier sector of the housing market (cf. Aldershof, 1999), increases in income, assets and in the potential selling price, all make the household less credit-constrained, and thus lead to an increase in mobility rates. For renters it is the housing cost that plays the decisive role. Hence, for them, increases in income may then make the household no longer eligible for a dwelling from the social rental market, leading to a sharp increase in housing cost. Because these households cannot be forced to move out of their existing unit, they may decide to stay in this cheaper unit, which results in lower mobility rates (cf. Clark and Heskin, 1982).

In conformity with expectations, household characteristics indicating stages in the life course play an important role in explaining the variation in residential mobility rates. Age, which is generally seen as the most important proxy for different stages in the life course, turns out to negatively affect the hazard rate (for similar findings, see Clark et al., 1986; or Mulder, 1993). In contrast to Clark et al.(1986), we find evidence of a non-monotonic relation between age and residential mobility (see also Davies and Pickles, 1991; Clark and Dieleman, 1996). Our results indicate that residential mobility rates decrease with age, but at a lower rate with increasing age (as indicated by age squared). Young people, however, tend to move much more frequently than older people. Another factor indirectly related to the household's life course is housing space, as measured by the number of rooms (cf. Clark et al., 1986). Unexpectedly at first sight, we find a positive effect of the number of rooms, and a negative effect of the interaction of age with the number of rooms on mobility rates in the rental market. Possible reasons for this finding are that younger households in the larger rental units move away from the rental sector to the owner-occupier sector of the housing market, e.g. for portfolio reasons. Earlier results, for which we pooled the rental and

owner-occupier market, indicated a strong and significant negative effect on residential mobility in general (see also, Clark, 1992). Others argue that it is not so much space that determines residential mobility, but rather the actual number of rooms relative to the required number of rooms (see Pickles and Davies, 1985). Their results, however, also suggest that the effect of space on the hazard rate of residential mobility depends on the transition type. For transitions from renting to owner-occupation, and from owner-occupation to renting, they find a statistically significant, positive effect of space on residential mobility. For transitions within the rental or owner-occupier sector of the housing market, they find a statistically significant, negative effect on residential mobility.

Labor and occupation-related reasons of moving residence which turned out to be less important (see Table 2) nevertheless explain a substantial part of the variation in mobility rates between households. Similar to other findings in the literature, we find that the highly educated have much higher mobility rates than those with lower or intermediate vocational education (see also Van Ommeren, 2000). In addition, at least for the owner-occupiers, commuting distance has a positive and significant effect on the hazard rate of moving (see similarly Van Ommeren, 2000).

In the introduction to this paper we argued that the process of residential relocation is embedded in, and influenced by, the housing market conditions at the local level. In the analysis reported thus far we considered variation in residential mobility across housing markets without determining the housing market features that explain these differences. The question naturally arises as to what determines these differences in mobility rates. This issue is considered in the remaining part of this section, where we determine the effect of housing market features[1]. We analyze the impact of three important features of the local housing market. First, we estimate models for different levels of urbanization (of the city) by rental and owner-occupier sectors of the housing market separately. Also, we include the share of social rental housing in the analysis as a measure of governement intervention. Finally, we consider the size of the housing market by including the number of housing units in the analysis. Other important housing market features, like the average house price, are basically determined by the tenure structure of the housing market (cf. Clark and Dieleman, 1996; Dieleman et al., 2000), and

[1]As is well known, relating the behavior of individuals or households to aggregate market characteristics is not an easy task (cf. Manski, 1995). Manski points out that the presence of endogenous effects means that the individual behaves in a way that depends on the prevalence of that behavior in the neighborhood or local housing market. Alternatively, contextual effects may be present, where the aggregate behavior of the neighborhood is determined by the endogenous composition of that neighborhood. To avoid this, we in this paper consider local housing market factors which are exogenous; influenced neither by individual households nor by the composition of the local housing market, so that both endogenous and contextual effects are not likely to be present.

therefore not included in the empirical analysis. In Table 4 we report these results (*highly urbanized areas* (HU) *urbanized areas* (U) and r*ural areas* (R)), by rental (r) and owner-occupier (o) sectors of the housing market. Reference cases are again indicated with (-), with * indicating significance at the 5% level and ** at the 10% level.

The differences in local housing markets can not be seen to be related to the share of social rental housing and the total housing stock only. Our results suggest that an important difference in local mobility rates is determined by *differences in the degree of urbanization*. Generally, these differences are attributed to differences in households, housing stock and other local housing market factors. Our results show that age, household size and composition have different effects on mobility rates between highly urbanized and rural areas. Thus, variations in mobility rates with respect to different levels of urbanization are the result of differences not only in, for example age, but also in *behavior* and *attitudes* with respect to housing. For instance, households in highly urbanized areas may attach more value to amenities like a theatre than to having a garden or a garage (see the discussion in Mulder, 1993, who considers moves to and from the four biggest cities in the Netherlands). Also, as has been argued by Clark and Dieleman (1996), government intervention may affect housing preferences through the tenure structure of a housing market.

Regarding the local housing market factors, our results indicate that the *share of social rental housing* has a positive effect on residential mobility in *urbanized* housing markets, but does not affect residential mobility rates in *rural* areas. This may suggest that government intervention by means of allocation rules in and by itself does not decrease residential mobility of households, rather facilitate the matching process of housing and households. One of the main reasons why the share of (social) rental housing increases residential mobility is that it affects the ability to move to ownership (Clark and Dieleman, 1996). Dieleman et al. (2000) argue that much of the moves in local housing markets is generated by moves within and from the rental housing sector (both social and private rental). Also, social renters wishing to move but no longer eligible for the social rental market, will generally enter the owner-occupier sector of the housing market. This supports our finding that in highly regulated housing markets as urban housing markets typically are, with shares of social rental housing up to 55%, residential mobility rates are high in both rental and owner-occupier sectors of the housing market. From this perspective, differences in residential mobility rates between housing markets indeed arise because of differences in the tenure structure and the degree of government intervention across housing markets.

Another important factor which could explain differences between local housing markets is the *size of the housing market* denoted as housing stock.

Table 4: Results for the stock data proportional hazard model for different levels of urbanization

	HU_r	HU_o	U_r	U_o	R_r	R_o
age (/100)	-12.23*	-31.28*	-14.48*	-20.51*	-19.35*	-21.14*
head	-0.06	-0.28*	0.04	-0.40*	-0.21*	-1.36*
head+child	-0.16*	-1.14*	-0.57*	-0.07	-0.09	-1.28*
head+partner	-	–	-	-	-	-
head+partner+child	-0.12**	-0.16**	-0.16	-0.18**	-0.31*	-0.15*
multiple households	-0.75*	-2.19*	-0.28	-2.60*	-1.63*	-2.12*
household size	-1.07**	-8.49*	-1.10	2.65**	2.14*	3.90*
number of rooms	0.15*	0.05	0.54*	-0.21**	0.25*	-0.18*
detached house	-0.04	-0.30*	-0.88*	-1.01*	-0.92*	-1.04*
semi-detached	-0.12	-0.19**	-0.30**	-0.64*	-0.85*	-0.81*
corner house	-0.20*	-0.12	-0.20*	-0.68*	-0.51*	-0.74*
terraced house	-0.08**	-0.20*	-0.17*	-0.63*	-0.56*	-0.87*
apartment	-	-	-	-	-	-
self-employed	-0.17*	-0.02	-0.29*	-0.28*	-0.06	-0.11**
employee	-	-	-	-	-	-
unemployed	0.20*	0.28	0.26*	0.09	0.40*	0.10
not-in-labor force	0.14*	-0.003	0.05	0.04	0.28*	0.06
student	-0.01	0.09	0.03	-0.06	-0.02	-0.07*
low vocational	0.11*	-0.14*	-0.04	-0.23*	-0.32*	-0.37*
intermediate vocational	-	-	-	-	-	-
high vocational / university	0.28*	0.11**	0.10	0.11**	0.09	0.27*
commuting distance (/100)	-0.05	-0.18	-0.43*	0.23**	-0.03	0.49*
ln(income/1000)	-0.13*	0.11*	-0.07**	0.19*	-0.010	0.03
assets (/1000)	0.0003	0.001	-0.002	-0.01	-0.006	-0.003
age × household size	4.62*	17.77*	3.29	-4.14	-4.17*	-9.03*
age × number of rooms	-0.95*	-0.51*	-1.91*	0.05	-1.13*	0.13
age × age	6.17*	16.95*	12.58*	9.75*	14.43*	10.90*
ln(potential selling price)	-	0.79*	-	1.10*	-	0.48*
ln(monthly rent)	1.02*	-	1.47*	-	1.35*	-
local housing market features						
share of social rental housing	-0.25	0.96*	1.42*	2.14*	-0.17	0.43
ln(housing stock/1000)	-0.03	0.07	-0.14*	-0.04	0.07	0.03
Baseline hazard						
ψ_1 : t $\leq$ 9 year	-4.87*	1.27**	-8.00*	-3.41*	-6.20*	0.77
ψ_2 : 9 $<$ t $\leq$ 17 year	-3.07*	3.63*	-6.06*	-1.32	-4.21*	2.83*
ψ_2 : 17 $<$ t $\leq$ 25 year	-3.22*	4.53*	-5.96*	-0.81	-4.23*	3.40*
ψ_2 : 25 $<$ t $\leq$ 38 year	-2.06*	5.19*	-4.80*	0.31	-2.39*	4.42*
ψ_2 : t $>$ 38 year	-1.21*	5.98*	-3.61*	0.54	-1.40*	5.20*
Number of observations	12231	7156	4659	5206	8583	14346
Log-likelihood	-38560	-22847	-14718	-16926	-27820	-47656

The results, however, indicate hardly any statistical effect of the total housing stock. The usual theoretical justification is that, because most moves are within the same local housing market, those households in larger markets have more possibilities to improve on their current dwelling. It might, however, be that larger markets also lead to a less transparent housing market, which offsets the increasing possibilities to improve on the current dwelling. Another explanation is that it is not so much the size of the housing market, rather the change in the size of the housing market which explains differences between housing markets (cf. Dieleman et al., 2000).

Also, differences in the labor market concerning, for instance, the number of local jobs available, may explain differences in residential mobility rates across housing markets. Moreover, in highly urbanized areas, good and efficient public transportation is generally available, which, together with the existence of employment centers in or near metropolitan areas, may also explain why long commuting distances do not increase residential mobility in highly urbanized housing markets. It should be noted, however, that commuting distances are likely to be small in these areas. Nevertheless, if commuting were to be measured in terms of travel time, then, because of congestion, the true picture may be quite the opposite. For this to conclude, however, even more in-depth modeling is necessary as to relate differences in residential mobility rates across local housing markets to these local housing and labor market features.

6 Conclusion

Residential mobility is one of the key factors in the demographic dynamics of the neighborhood and important for the functioning of the local housing and labor market. This process of residential choice and mobility are, in turn, intimately related to *local* circumstances. Analyzing the determinants of residential duration may lead to valuable information about residential mobility, and the possibilities for public policies to affect residential moving behavior. This paper addresses the interplay between residential mobility at the household level and local housing market conditions.

Our analysis showed large differences in residential mobility rates between households and across local housing markets. In general, residential mobility is thought to be triggered by changes in the family life course and related changes in housing demand, or labor market changes. We have concentrated on all these factors, taking account of the variation in mobility rates across different local housing markets. Regarding spatial variation in residential mobility rates, it turns out that there are substantial differences between local housing market dynamics, with high mobility rates in some housing markets and low mobility rates in other housing markets. The analysis also showed that local housing market conditions have differ-

ent effects on mobility rates for renters and owner-occupiers, where in some local markets conditions decrease mobility of renters but increase mobility of owner-occupiers. Moreover, there seems to exist a distinctive geography of residential mobility in local housing markets, with lower mobility rates in the core regions than in the regions at the periphery.

The analysis also indicated that housing markets in urbanized areas function differently compared rural areas. As we had expected, housing demand and life course effects still seem to be important determinants in residential mobility. Yet, our results show that age, household size and composition have different effects on mobility rates between (highly) urbanized and rural areas. Thus, variations in residential mobility rates across urban and rural housing markets are the result of differences not only in, for example age, but also in *behavior* and *attitudes* with respect to housing.

Moreover, differences in residential mobility rates can be related to differences in the local structure of the housing market, the degree of government intervention (as measured through the share of social rental housing) and the size of the housing market. The results revealed that the share of social rental housing increases residential mobility in urbanized housing markets, but does not affect residential mobility rates in rural areas. In general, much of the moves in local housing markets is generated by moves within and from the rental housing stock, leading to higher mobility rates in markets with a large rental stock. Also, in regulated housing markets with stringent allocation rules and high shares of social rental housing, residential mobility is more often associated with a transition to the owner-occupier sector. So in highly regulated housing markets as urbanized areas typically are, this lead to higher mobility rates in both housing market sectors than in rural areas. The size of the housing stock, however, did not turn out to be an important determinant of the variation in residential mobility across local housing markets. This suggests that it is not the size of the housing stock, rather the change in the size of the housing stock which explains differences in mobility across space. More research on this topic, however, is needed in order to better comprehend the interplay between residential mobility and the local housing market structure, to fully understand what determines high residential mobility rates in some housing markets while low mobility rates in other markets. Also, more research is needed to understand the exact nature of the distinctive geography of residential mobility in local housing markets with, in large, lower mobility rates in the core regions than in the regions at the periphery.

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A Estimation Results for Local Housing Market Dummies

	Rental Market	Owner Market
Ommelanden Groningen	-	-
Groningen City	-0.32**	-0.36
Northern Friesland	-0.03	-0.02
Eastern Friesland	0.07	-0.29*
North/Central Drenthe	-0.22	-0.01
East/Western Drenthe	-0.29*	-0.12
Almelo City	0.05	-0.43*
Hengelo/Enschede City	-0.30*	-0.23**
IJssel valley	-0.09	-0.33*
West/Northern Veluwe	-0.50*	-0.57*
East Veluwe	-0.30**	-0.46*
Achterhoek	-0.49*	-0.90*
Arnhem area	-0.54*	-0.79*
Nijmegen area	-0.90*	-0.43*
Betuwe	-0.77*	-0.47*
Eastern Utrecht	-0.36*	-0.62*
Western Utrecht	-0.39*	-0.83*
Gooi	-0.62*	-1.19*
Amsterdam	-0.75*	-0.46*
Zaanstreek	-0.31**	-0.65*
Zuid Kennemerland	-0.64*	-0.37*
Central Kennemerland	-0.63*	-0.55*
Amstelland	-0.36*	-0.47*
Northern part of North-Holland	-0.28**	-0.59*
North Kennemerland	-0.03	-0.50*
Leiden area	-0.51*	-0.83*
Den Haag	-0.46*	-0.50*

continued on the next page

	Rental Market	Owner Market
Westland	-0.82*	-0.89*
Rijn Midden Holland/Alblasserwaard	-1.19*	-0.58*
Drechtsteden/Hoeksewaard	-0.56*	-0.46*
Rotterdam area (Rijnmond)	-0.36*	-0.37*
North/Central Zeeland	-0.24	-0.24**
Southern Zeeland	-0.76*	-0.40*
Roosendaal area	-0.13	-0.62*
Breda area	-0.43*	-0.78*
Central part of North-Brabant	-0.42*	-0.94*
Den Bosch area	-0.33**	-0.90*
Helmond area	-0.29	-0.57*
Eindhoven area	-0.36*	-0.61*
North-eastern part of North-Brabant	-0.23	-0.92*
Northern Limburg	-0.75*	-0.68*
Central Limburg	-0.37**	-0.72*
Eastern Limburg	-0.41*	-0.66*
Mining area	-0.53*	-0.74*
Southern Limburg	-0.35*	-0.93*
Flevoland	-0.10	-0.13

- reference case.

* significant at the 5 % level.

** significant at the 10 % level.